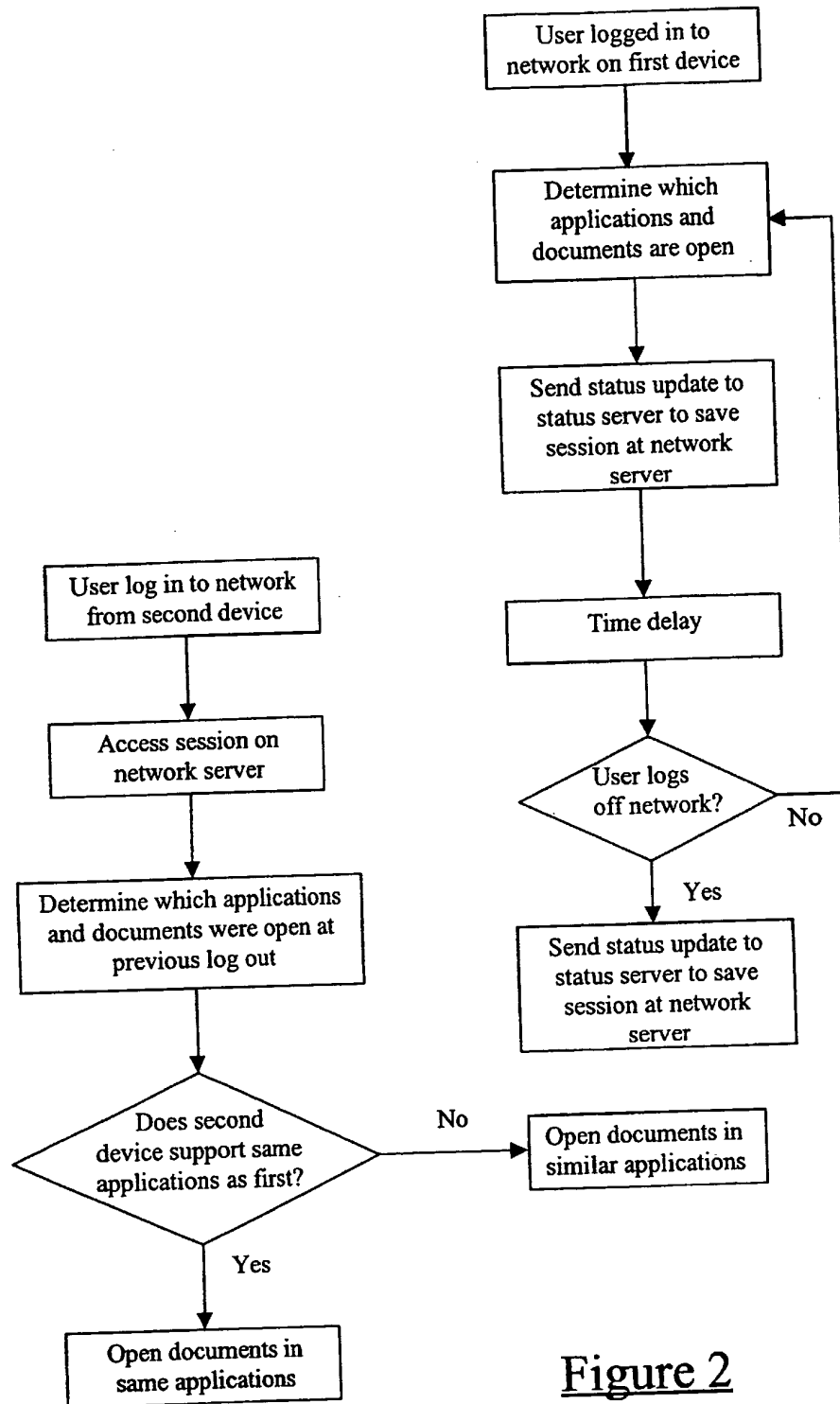


Figure 1

**Figure 2**

Sharing Resources over a Network

Field of the Invention

- 5 The present invention relates to the sharing of resources over a network.

Background to the Invention

- 10 With the increasing interest in the Internet and advances in mobile telephone technology, it is becoming increasingly common for people to access a "home" network or computer from a variety of locations, using a variety of devices such as desktop computers, laptop computers, digital TVs, PDAs, WAP phones etc.

- 15 In conventional computer networks (e.g. LANs), so-called "virtual desktops" are known where the desktop configuration used by a user is recorded on a network server so that, wherever the user logs onto the network from, he is presented with his own desktop configuration. Using this desktop, the user can access files stored on the network server.

20 Statement of the Invention

- 25 According to the virtual desktop concept, when a user stops using one network computer and starts using another, he must have previously logged out of the first computer and must re-login to the network from the second computer, and open all applications and documents again. For example, if a user wishes to continue working on a text file from the second computer, he will need to open a suitable word processor application and import the document into that file. It is not possible for the user to seamlessly move between the first and second computers.

- 30 According to a first aspect of the present invention there is provided a method of sharing resources over a network to which a number of active client computers are coupled, the method comprising:

periodically sending status information from said active client computers of the network to a central status server;

at the status server, recording status information for the registered users of the active client computers;

5 whenever a new client computer becomes active in the network, determining the status information recorded for the user of the new client computer, sending the status information to the new client computer, and configuring the new client computer according to the received status information.

10 It will be understood that the status server maintains a session, using the status information, for each registered user rather than for each client computer. This facilitates the implementation of a roaming desktop for users. A newly connected client computer uses the status information received from the status server to reconstruct, as closely as possible, the desktop as last viewed by the user.

15 Typically, said status information which is sent periodically from client computers to the status server, defines the sessions which exist at the active client computers when the information is sent. For example, for a given client computer, the information may identify changes which have been made to a desktop since status information was last
20 sent to the status server, e.g. new applications opened, applications closed, the position of a cursor in a viewed file. The status information may also identify changes made to a file open on the desktop since the file was last saved.

It will be appreciated that embodiments of the present invention may allow a network
25 user to move seamlessly between client computers, being presented at each new computer with substantially the same session as was being used at the previous computer, or a version of that session converted into a form suitable for presentation on the new client computer.

30 The network of the present invention may be single homogeneous network such as a LAN or a mobile telecommunications network. The network may alternatively be a composite network comprising several different sub-networks, for example a LAN, the Internet, and a mobile telecommunications network. The client computers may be any

computer device including, but not limited to, desktop computers, laptop computers, PDAs, mobile phones/communicators, and/or digital televisions which allow a communication to access the network.

- 5 The central status server may be located in a LAN, for example a user's home LAN. Alternatively however, the status server may be located in the Internet, or in a mobile telecommunications network. Typically, a user registers with the session server using a password and/or other secure connection process.
- 10 Certain embodiments of the present invention may provide for the transformation of files at the status server between file formats. This may be necessary where two client computers used by the same user do not share a common application or device structure for processing a file. This may be achieved by adding mark-up transformations to a file to encode it into a format readable by the different applications or different devices.
- 15 The format may be one from the list of xml (extended mark-up language), sgml (standard general mark-up language), and html (hypertext mark-up language). The choice of application to open a file may be made by the new client computer.

- According to a second aspect of the present invention there is provided a status server
- 20 arranged in use to be coupled to a network, the status server comprising:
- an input for receiving status information sent periodically from client computers coupled to the network and which are active, said status information defining the sessions currently existing at the respective client computers;
 - a memory, and first processing means for recording status information in the
 - 25 memory associated with the respective client computer users;
 - second processing means for identifying recorded status information for newly active client computers on the basis of the users of the newly active client computers;
 - and
 - output means for sending the identified recorded status information to the newly
 - 30 active client computers.

According to a third aspect of the present invention there is provided a client computer arranged in use to be connected to a network, the computer comprising:

first processing means for periodically sending status information to a central status server of the network when the computer is active on the network, the status information defining the session existing at the client computer and/or changes to the session; and

- 5 second processing means for receiving status information from the central status server when the computer logs on to the network, and for configuring the computer in accordance with the received status information.

Brief Description of the Drawings

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Figure 1 is a schematic representation of a network according to the invention.

Figure 2 is a flow chart showing a method of logging in to and out of the network of Figure 1.

15

Detailed Description of the Preferred Embodiment

- Figure 1 illustrates a corporate Local Area Network (LAN) 1. The LAN 1 has a number of registered users who may access the LAN using any suitable device by entering a password and user name. Shown in Figure 1 are a network server 2 and a plurality of client computers 3, 4, 5. The client computers may be for example desktop PCs and/or laptop computers.
- 20

- The LAN 1 comprises an Internet server 6 which is coupled to the Internet 7 via an IP gateway 8. The Internet is further coupled via another IP gateway 9 to a mobile telecommunications network 10. The telecommunications network 10 provides an access network for mobile terminals (such as terminals 11, 12) to the Internet and the LAN 1. The mobile terminals may be WAP phones, or PDAs, or palmtop or laptop computers with wireless phone connections. A registered user of the LAN 1 may connect to the LAN via the telecommunications network 10 and the Internet 7 using his username and password (and/or other security mechanisms).
- 25
- 30

For each registered user, a status server operating at the network server 2 maintains a state machine which records a session. This session identifies the desktop session which exists at the device currently being used by the user, or the desktop session which existed at the last device used by the user. The session identifies which files are open on a device, the state of these files, and even the location of the cursor in the open files. When a user is logged onto the network (either directly or indirectly through the telecommunications network and the Internet), the device which he is using will periodically send status updates to the status server at the network server. The sending of updates may be initiated by the client computer itself, or as a result of a request (or poll) received from the status server. The status updates identify changes made to a client computer's desktop since the last update was sent. This includes changes to any files which are open on the desktop.

When a registered user of the LAN 1 logs on to the LAN 1 from a device, the status server identifies the user and recalls the status information recorded for that user. It then transmits this information to the device which the user is using. The device opens a new desktop configured using the received status information. Thereafter, until the user logs off from the device, status updates are sent periodically from the device to the status server.

If a user logs off of a device, closing all open applications as he does so, the session recorded at the status server will reflect this action, and when the user next logs on from the same or a different device, he will be presented with an empty desktop. However, if a user walks away from a device without logging off, or logs off without closing open applications, when he logs onto the LAN with a new device, the status information received from the status server will cause the new device to display a desktop corresponding to that which the user left on the old device. The user is thus able to access a "roaming desktop".

It will be appreciated that if a user has two (or more) sessions running simultaneously on different devices, the status server may cause one of the sessions to be locked to prevent conflicts from arising. Alternatively however, the status server may cause status messages, received from an active device, to be forwarded to another idle device

to which the user is logged on. The idle device receiving these messages may update its desktop accordingly in order to synchronise itself to the active device.

Clearly not all devices will run (or be capable of running) the same applications. For example, a PDA may not be capable of running the same application as is run on a desktop PC. In this situation it may be necessary to use different applications to open the same file on different devices. In order to facilitate this, the status server may comprise or be coupled to a "Mediator" capable of performing transformations so that a file can be accessed by a variety of different applications. For example, a text document formatted by a particular word processor application will be rendered into html or xml so that it can be read by any word processor application, or indeed by any Internet browser. Similarly, if a WAP phone is used to access the LAN, the mediator will render the file in WML so that it can be accessed. This rendering may be done continuously, so that a rendered file is always available when a user logs on using a device which cannot run the base application. Alternatively, rendering may only be done when a user logs on from a new device which requires that the file be rendered.

It is possible that in the near future the most common file format will be XML, in which case the transformations required will be from one XML variant to another. For example, if a file is created at one client computer in XHTML format including GIF images and the new client computer has an application which supports only WML and WBMP (wireless bitmap) images, the Mediator must transform the file from XHTML to WML (including transforming the image files from GIF to WBMP).

Figure 2 is a flow diagram illustrating further the method of the present invention.

It will be appreciated by the person of skill in the art that various modifications may be made to the above described embodiments without departing from the scope of the present invention. It can be envisaged for example that a mobile wireless terminal may be coupled to the LAN 1 via a local wireless connection to a fixed network connection. For example, a PDA may communicate with the fixed connection via a BluetoothTM or wireless LAN link, with status information being exchanged between the LAN 1 and

the PDA via the local link. Such a mechanism may be used even where the PDA has a mobile telephone connection, for reasons of cost.

5 It has been mentioned that file format transformations may be required where a newly connected client computer is incapable of presenting a file in its "original" format. This may require a change in the medium used to present the file. For example, where a document is created as a text file (e.g. WordTM), the file may need to be converted into an audio format for playing at a client computer (e.g. digital radio or mobile phone) which does not have a display screen. The conversion may be done at the status server
10 or at the new client computer (or indeed at some other client computer or node).

CLAIMS:

1. A method of sharing resources over a network to which a number of active client computers are coupled, the method comprising:
 - 5 periodically sending status information from said active client computers of the network to a central status server;
at the status server, recording status information for the registered users of the active client computers;
whenever a new client computer becomes active in the network, determining the
10 status information recorded for the user of the new client computer, sending the status information to the new client computer, and configuring the new client computer according to the received status information.
2. A method according to claim 1, wherein said status information identifies
15 changes which have been made to a desktop since status information was last sent to the status server.
3. A method according to claim 1 or 2, wherein the status information recorded at
the central status server identifies, for each user, applications and files open on an active
20 client computer used by the user, and the status of the open applications and files.
4. A method according to claim 3, wherein for a given user the status information
identifies a portion of an open file which is visible on the display of a client computer
used by the user, and said step of configuring the new client computer comprises
25 opening the file on the new computer and displaying that visible portion or a part of the portion.
5. A method according to claim 3, wherein for a given user the status information
identifies the location within an open file which was last accessed by the user, and said
30 step of configuring the new client computer comprises opening that file at that location.
6. A method according to any one of the preceding claims, wherein files accessible
to a network user via the network are transformed from the format in which they were

generated to at least one other format, and are stored on the network, wherein the same file may be accessed from different client computers having different applications and/or device configurations.

- 5 7. A method according to claim 6, wherein mark-up transformations are added to a file to encode it into a format readable by the different applications or different devices.
8. A method according to claim 7, wherein said format is one from the list of xml (extended mark-up language), sgml (standard general mark-up language), and html
10 (hypertext mark-up language).
9. A status server arranged in use to be coupled to a network, the status server comprising:
- an input for receiving status information sent periodically from client computers
15 coupled to the network and which are active, said status information defining the sessions currently existing at the respective client computers;
- a memory, and first processing means for recording status information in the memory associated with the respective client computer users;
- second processing means for identifying recorded status information for newly
20 active client computers on the basis of the users of the newly active client computers; and
- output means for sending the identified recorded status information to the newly active client computers.
- 25 10. A client computer arranged in use to be connected to a network, the computer comprising:
- first processing means for periodically sending status information to a central status server of the network when the computer is active on the network, the status information defining the session existing at the client computer and/or changes to the
30 session; and
- second processing means for receiving status information from the central status server when the computer logs on to the network, and for configuring the computer in accordance with the received status information.



Application No: GB 0102834.9
Claims searched: 1-10

Examiner: Richard Howe
Date of search: 21 November 2001

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK CI (Ed.S): H4K (KFMA)
Int CI (Ed.7): H04Q (3/00)
Other: Online : wpi ; epodoc ; paj

Documents considered to be relevant:

| Category | Identity of document and relevant passage | Relevant to claims |
|----------|---|--------------------|
| | NONE | |

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